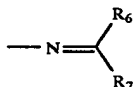


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$R_8$  and  $R_9$  are independently oxygen, or sulfur;  
Q6, Q7, and Q10 may optionally be unsaturated contain-  
ing one or two double bonds in the 6-membered ring;  
Z is amino, hydroxyl, thiol, formyl, carboxyl, cyano,  
alkylcarbonyl, arylcarbonyl, azido, or one of the fol-  
lowing:



wherein  $R_4$  is alkyl, alkenyl, alkynyl, amino, cycloalkyl, heterocycloalkyl, alkylsulfonyl, arylsulfonyl, benzyl, aryl, heteroaryl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxy carbonyl, alkylthiocarbonyl, cycloalkylthiocarbonyl, arylthiocarbonyl, heteroarylthiocarbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylaminocarbonyl, alkoxy carbonyl carbonyl or arylcarbonyl carbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxy carbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, alkenylthiocarbonyl, alkylsulfonyl, alkenylthiocarbonyl, alkynylthiocarbonyl, aryl, arylcarbonyl, aryloxy, aryloxy carbonyl, arylthio, heteroaryl, heteroarylthiocarbonyl or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxy carbonyl, aryl, or heterocycloalkyl; and  $R_5$  is hydrogen or any one of the groups represented by  $R_4$ ; or  $R_4$  and  $R_5$  could combine to form a 4-8 membered heterocyclic ring;



wherein  $R_6$  represents alkyl, haloalkyl, dialkylamino, unsubstituted or substituted aryl and heteroaryl; and  $R_7$  represents hydrogen, halogen or any of the groups represented by  $R_6$ ;

—OR<sub>4</sub>,  
—SR<sub>4</sub>,  
—CH<sub>2</sub>R<sub>10</sub>,  
—CH(R<sub>10</sub>)<sub>2</sub>,  
—C(R<sub>10</sub>)<sub>3</sub>, or  
—CH=CHR<sub>10</sub>

wherein  $R_{10}$  is carboxyl, alkyl, alkenyl, alkynyl, amino, cycloalkyl, heterocycloalkyl, alkylsulfonyl, arylsulfonyl, benzyl, aryl, heteroaryl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxy carbonyl, alkylthiocarbonyl, cycloalkylthiocarbonyl, arylthiocarbonyl, heteroarylthiocarbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylaminocarbonyl, alkoxy carbonyl carbonyl or arylcarbonyl carbonyl, where any of these groups may be

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unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, cycloalkyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxy carbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonyl, alkenylthiocarbonyl, alkynylthiocarbonyl, aryl, arylcarbonyl, aryloxy, aryloxy carbonyl, arylthio, heteroaryl, heteroarylthiocarbonyl or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxy carbonyl, cycloalkyl, aryl, or heterocycloalkyl;

provided that (1) Z is not alkyl, alkoxy, haloalkyl, haloalkoxy, alkylthio, haloalkylthio, alkenyl, haloalkenyl, amino, monoalkylamino, dialkylamino, alkoxyalkoxy or cyano, when Q is Q1 and  $R_2$  is haloalkyl.

2. The compound according to claim 1 wherein Z is represented by the following:



wherein  $R_4$  and  $R_5$  are the same as defined in claim 1;

or —CH<sub>2</sub>R<sub>10</sub>,

wherein  $R_{10}$  is the same as defined in claim 1.

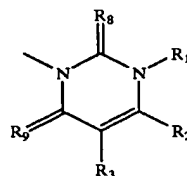
3. The compound according to claims 1 or 2 wherein X is halogen or cyano;

Y is halogen;

W is OR;

R is alkyl, alkenyl, or alkynyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, or carboxyl.

4. The compound according to claim 1 wherein Q is



wherein  $R_1$  is alkyl, amino, or haloalkyl;

$R_2$  is haloalkyl;

$R_3$  is hydrogen;

$R_8$  and  $R_9$  are independently oxygen, or sulfur.

5. The compound according to claim 1 wherein X is a halogen;

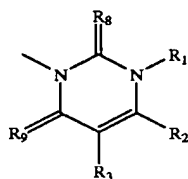
Y is fluorine;

W is OR; R is alkyl, alkenyl, or alkynyl, where any of these groups may be unsubstituted or substituted with halogen or cyano;

Q1

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Q is



wherein R<sub>1</sub> is alkyl, amino, or haloalkyl;  
 R<sub>2</sub> is haloalkyl;  
 R<sub>3</sub> is hydrogen;  
 R<sub>8</sub> and R<sub>9</sub> are independently oxygen, or sulfur;  
 Z is represented by the following:



wherein R<sub>4</sub> is alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxy carbonyl, alkylthiocarbonyl, cycloalkyloxy carbonyl, aryloxy carbonyl, arylthiocarbonyl, aryl-thiocarbonyl, heteroaryloxy carbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylaminocarbonyl, alkoxy carbonyl, or arylcarbonyl carbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxy carbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonyl, alkenyloxy carbonyl, alkynyloxy carbonyl, aryl, arylcarbonyl, aryloxy, aryloxy carbonyl, arylthio, heteroaryl, heteroaryloxy carbonyl, or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxy carbonyl, aryl, or heterocycloalkyl; and R<sub>5</sub> is hydrogen; or —CH<sub>2</sub>R<sub>10</sub>.

wherein R<sub>10</sub> is carboxyl, alkyl, alkenyl, or alkynyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, cycloalkyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxy carbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonyl, alkenyloxy carbonyl, alkynyloxy carbonyl, aryl, arylcarbonyl, aryloxy, aryloxy carbonyl, arylthio, heteroaryl, heteroaryloxy carbonyl, or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxy carbonyl, cycloalkyl, aryl, or heterocycloalkyl.

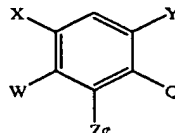
6. A compound selected from the group consisting of 3-(2-amino-4-chloro-6-fluoro-3-methoxyphenyl)-1-methyl-

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6-trifluoromethyl-2,4(1H,3H)pyrimidinedione and 3-(2-amino-4-chloro-6-fluoro-3-methoxyphenyl)-1-amino-6-trifluoromethyl-2,4(1H,3H)-pyrimidinedione.

7. A herbicidal composition, characterized in that it contains at least one compound according to claim 1 and an agricultural adjuvant.

8. A process for preparing a compound represented by the formula I-1 or its salts:

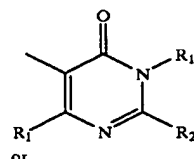
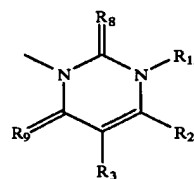


wherein X is hydrogen, halogen, nitro, amino, NHR, N(R)<sub>2</sub>, amide, thioamide, cyano, alkylcarbonyl, alkoxy carbonyl, alkylsulfonamide, unsubstituted or substituted alkyl, haloalkyl, alkoxy, haloalkoxy, alkoxy carbonylalkoxy, benzloxy, aryloxy, or heteroaryloxy;

Y is hydrogen, halogen, or nitro;

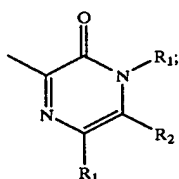
W is hydrogen, OR, SR, NHR, N(R)<sub>2</sub>, CH<sub>2</sub>R, CH(R)<sub>2</sub>, C(R)<sub>3</sub>, halogen, nitro, or cyano, where multiple R groups represent any possible combination of substituents described by R; R is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl, alkoxy, cycloalkyloxy, aryloxy, heteroaryloxy, alkylsulfonyl, benzyl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxy carbonyl, aryloxy carbonyl, or heteroaryloxy carbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, carboxyl, alkyl, haloalkyl, alkylsilyl, alkylcarbonyl, haloalkylcarbonyl, alkoxy, alkoxy carbonyl, haloalkoxy, haloalkoxy carbonyl, alkylsulfonyl, haloalkylsulfonyl, aryl, heteroaryl, or cycloalkyl;

Q is a heterocycle:



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-continued



wherein  $R_1$  is hydrogen, alkyl, haloalkyl, alkenyl, alkynyl, amino, alkoxyalkyl, acetyl, alkoxy-carbonylamino, alkylcarbonylamino, or alkoxy-carbonyl;

$R_2$  is alkyl or haloalkyl;

$R_1$  and  $R_2$  could combine to form a five- or six-membered heterocyclic ring;

$R_3$  is hydrogen, halogen, nitro, amino, alkylamino, haloalkylamino, cyano, or amide;

$R_8$  and  $R_9$  are independently oxygen, or sulfur;

Q6, Q7, and Q10 may optionally be unsaturated containing one or two double bonds in the 6-membered ring;

$Z'$  is one of the following:



wherein  $R_4$  is alkyl, alkenyl, alkynyl, amino, cycloalkyl, heterocycloalkyl, alkylsulfonfyl, arylsulfonfyl, benzyl, aryl, heteroaryl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxy-carbonyl, alkylthiocarbonyl, cycloalkyloxycarbonyl, aryloxycarbonyl, arylthio-carbonyl, aryl-thiocarbonyl, heteroaryloxycarbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylamino-carbonyl, alkoxy-carbonylcarbonyl, or arylcarbonylcarbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxy-carbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonfyl, alkenyloxycarbonyl, alkynyloxycarbonyl, aryl, arylcarbonyl, aryloxy, aryloxycarbonyl, arylthio, heteroaryl, heteroaryloxycarbonyl, or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxy-carbonyl, cycloalkyl, aryl, or heterocycloalkyl; and  $R_5$  is hydrogen or any one of the groups represented by  $R_4$ ; or  $R_4$  and  $R_5$  could combine to form a 4-8 membered heterocyclic ring;

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Q13

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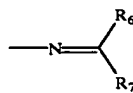
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wherein  $R_6$  represents alkyl, haloalkyl, dialkylamino, unsubstituted or substituted aryl and heteroaryl; and  $R_7$  represents hydrogen, halogen or any of the groups represented by  $R_6$ ;

$-\text{CH}_2\text{R}_{10}$ ,

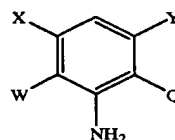
$-\text{CH}(\text{R}_{10})_2$ ,

$-\text{C}(\text{R}_{10})_3$ , or

$-\text{CH}=\text{CHR}_{10}$

wherein  $R_{10}$  is carboxyl, alkyl, alkenyl, alkynyl, amino, cycloalkyl, heterocycloalkyl, 25 alkylsulfonfyl, arylsulfonfyl, benzyl, aryl, heteroaryl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, cycloalkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxy-carbonyl, alkylthiocarbonyl, cycloalkyloxycarbonyl, aryloxycarbonyl, arylthio-carbonyl, aryl-thiocarbonyl, heteroaryloxycarbonyl, aminocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, heteroarylamino-carbonyl, alkoxy-carbonylcarbonyl or arylcarbonylcarbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, dialkylamino, hydroxyl, carboxyl, alkyl, alkenyl, alkynyl, cycloalkyl, alkylcarbonyl, alkylcarbonyloxy, alkoxy, alkoxy-carbonyl, alkylthio, alkylthiocarbonyl, alkoxythiocarbonyl, alkylaminocarbonyl, arylaminocarbonyl, alkylsulfonfyl, alkenyloxycarbonyl, alkynyloxycarbonyl, aryl, arylcarbonyl, aryloxy, aryloxycarbonyl, arylthio, heteroaryl, heteroaryloxycarbonyl or methylenedioxy, wherein the alkyl moiety or aryl moiety may be substituted with halogen, cyano, nitro, alkyl, alkoxy, haloalkyl, haloalkoxy, alkoxy-carbonyl, cycloalkyl, aryl, or heterocycloalkyl; provided that (1)  $Z'$  is not alkyl, haloalkyl, alkenyl, haloalkenyl, monoalkylamino, or dialkylamino, when Q is Q1 and  $R_2$  is haloalkyl,

which comprises of reacting a compound represented by the formula II:

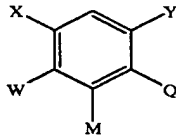


II

with a compound selected from the group consisting of an alkyl halide, alkyl acid halide, aryl acid halide, alkyl acid anhydride, aryl acid anhydride, alkylhaloformate, alkyl isocyanate, aryl isocyanate, alkyl dihalide, aliphatic aldehyde, aliphatic ketone, aromatic aldehyde, and aromatic ketone.

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9. A compound represented by the formula III:

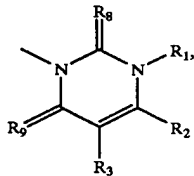


wherein X is hydrogen, halogen, nitro, amino, NHR, N(R)<sub>2</sub>, amide, thioamide, cyano, alkylcarbonyl, alkoxy carbonyl, alkylsulfonamide, unsubstituted or substituted alkyl, haloalkyl, alkoxy, haloalkoxy, alkoxy carbonylalkoxy, benzyloxy, aryloxy, or heteroaryloxy;

Y is hydrogen, halogen, or nitro;

W is hydrogen, OR, SR, NHR, N(R)<sub>2</sub>, CH<sub>2</sub>R, CH(R)<sub>2</sub>, C(R)<sub>3</sub>, halogen, nitro, or cyano, where multiple R groups represent any possible combination of substituents described by R; R is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl, alkoxy, cycloalkyloxy, aryloxy, heteroaryloxy, alkylsulfonyl, benzyl, alkylcarbonyl, alkenylcarbonyl, alkynylcarbonyl, arylcarbonyl, heteroarylcarbonyl, alkoxy carbonyl, aryloxy carbonyl, or heteroaryloxy carbonyl, where any of these groups may be unsubstituted or substituted with any of the functional groups represented by one or more of the following: halogen, cyano, nitro, amino, carboxyl, alkyl, haloalkyl, alkylsilyl, alkylcarbonyl, haloalkylcarbonyl, alkoxy, alkoxy carbonyl, haloalkoxy, haloalkoxy carbonyl, alkylsulfonyl, haloalkylsulfonyl, aryl, heteroaryl, or cycloalkyl;

Q is a heterocycle:



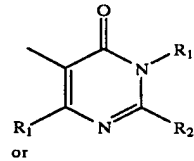
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Q12

III

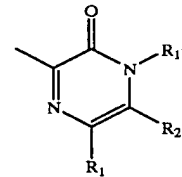
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Q13

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wherein R<sub>1</sub> is hydrogen, alkyl, haloalkyl, alkenyl, alkynyl, amino, alkoxyalkyl, acetyl, alkoxy carbonylamino, alkylcarbonylamino, or alkoxy carbonyl;

R<sub>2</sub> is alkyl or haloalkyl;

R<sub>1</sub> and R<sub>2</sub> could combine to form a five- or six-membered heterocyclic ring;

R<sub>3</sub> is hydrogen, halogen, nitro, amino, alkylamino, haloalkylamino, cyano, or amide;

R<sub>8</sub> and R<sub>9</sub> are independently oxygen or sulfur;

M is nitro.

10. A method for controlling undesired vegetation which comprises applying to a locus to be protected a herbicidally effective amount of a compound of claim 1.

Q1

11. The method of claim 10 wherein the locus to be protected is a cereal crop field.

12. The method of claim 11 wherein the compound of claim 1 is applied to soil as a preemergent herbicide.

13. The method of claim 11 wherein the compound of claim 1 is applied to plant foliage.

14. A method to defoliate potato and cotton using a compound of claim 1.

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